You will use either prezi.com or smore.com to answer the following questions. When you are finished you will present your research to your classmates and teacher with a padlet

You must do the following for your assigned chapter:

1) define and describe each vocabulary word

2) find practice problems for each formula and explain how you will use them and give the answer; if you need to take screen shots you may do so to add to your work

3) provide questions related to each learning target; past lab reports or in class work may help

4) identify and explain any big ideas of the unit.

Unit 1

Nature of Physics

Learning targets:

Students should be able to perform the following:

I can estimate values using metric measurements

I can identify variables in an experiment

I can determine the relationship between variables from data or a graph

I can construct a high quality graph from a set of data

I can values using scientific notation

I can calculate and express values in the proper amount of significant figures

I can derive a literal equation for any variable

I can calculate and express the slope of a line

Vocabulary

dependent variable

independent variable

relationship

direct

inverse

exponential

linear

significant figure

accuracy

precision

metric system of measurement

Formulas

S.N x 10n y = mx + b

Essential Questions

What is the nature of Physics?

What is the process of testing a hypothesis?

To what degree is this measurement significant?

What type of relationship exists between the variable in an experiment?

Physics

Unit 2: Projectile (2-D) Motion

Students should be to demonstrate the following after the course of study as they apply to objects launched horizontally assuming the effects of air are ignored:

|  |  |  |
| --- | --- | --- |
| Learning Target | Evidence | Self-Assessment |
| I can describe the ideal conditions for projectile motion |  |  |
| I can predict how air resistance will affect a projectile |  |  |
| I can explain how the components of motion act independently |  |  |
| I can diagram and calculate the horizontal and vertical components of a projectile |  |  |
| I can diagram and calculate initial and final velocity of a projectile |  |  |
| I can diagram and calculate the range and maximum height of a projectile |  |  |

Vocabulary

component -

horizontal -

parabola -

projectile -

range -

resultant -

trajectory -

vertical –

vector -

Formulas / Symbols / Units

Δ – delta (change in or difference)

Δx = (1/2) (v1+v0) t x – position (meters)

v – velocity (meters per second)

Δx = v0t + (1/2) a t2 t – time (seconds)

v12 = v02 + 2 a (Δx ) a – acceleration

ag – acceleraton due to gravity

v1 = v0 + a t 9.8 m/s2 at Earth’s surface

SOHCAHTOA sine / cosine / tangent - applied to right triangles

Unit 3 – Forces in Equilibrium (Statics and Newton’s First Law of Motion)

Students should be to demonstrate the following after the course of study:

|  |  |  |
| --- | --- | --- |
| Learning Target | Evidence | Self-Assessment |
| 3-1. I can describe the ideal conditions applied to the study of forces (ignoring friction). |  |  |
| 3-2. I can diagram and calculate the horizontal and vertical components of force. |  |  |
| 3-3. I can explain contact forces on the atomic scale using the particle model. |  |  |
| 3-4. I can mathematically describe frictional forces. |  |  |
| 3-5. I can explain and calculate the apparent weight of an object when it’s acceleration is zero. |  |  |
| 3-6. I can apply Newton’s first law of motion to mathematically describe and predict the effects of forces on complex systems of objects. |  |  |

Vocabulary

component

equilibrium

free-body diagram

forces

applied

elastic

electrostatic

friction

gravitational

net

normal

tension

nuclear

inertia

system

Formulas / Units / Symbols

SOH-CAH-TOA Fnet = F1 + F2 … +Fn

F2 = Fx2 + Fy2 Newtons (N) 1 N = 1 kg \* 1 m/s2

**Unit 4 – Force and Acceleration (Newton’s Second Law of Motion)**

**Learning Targets**

Students should be able to demonstrate the following during or after the course of study:

|  |  |  |
| --- | --- | --- |
| Learning Target | Explanation / Evidence | Self-Evaluation |
| I can interpret and construct a force (free-body) diagram. |  |  |
| I can diagram and calculate the components of force acting in two dimensions. |  |  |
| I can describe the relationship between net force, mass, and acceleration. |  |  |
| I can calculate the net force, mass, or acceleration of an object. |  |  |
| I can explain the difference between mass and weight given a changing gravitational field. |  |  |
| I can calculate apparent weight given a situation of vertical acceleration. |  |  |
| I can evaluate and develop a mathematical model for elastic (spring) forces. |  |  |
| I can predict the force required to slide an object relating to the coefficient of friction. |  |  |
| I can predict an object's motion and the associated forces of objects moving in a circle. |  |  |

Vocabulary

circular

centripetal

centrifugal

free-body diagram

friction

kinetic

static

linear

normal force

net force

tangent

torque

weight

apparent

weightlessness

**Formulas Symbol – Measurement (Unit)**

Fnet = m a Fnet – net force (Newtons)

m – mass (kg)

a = Δv / Δt a – acceleration

ag or g = 9.8 m/s2 on Earth – assumed

Δx= ½ at2 (if v0 = 0) Fg = mg or [W for weight]

v12 = v02 + 2a (Δx)

Felastic = k Δx k – spring constant (N/kg)

Δx – change in position (m)

Fk = μkFN μk – coefficient of kinetic friction

FN – normal force (N)

ac = v2 / r r – radius (meters)

Fc = mv2 / r

**Unit 5 – Momentum and Collisions (Newton’s Third Law of Motion)**

**Learning Targets**

Students should be able to demonstrate the following during or after the course of study:

|  |  |  |
| --- | --- | --- |
| Self Evaluation | Learning Target | Explanation / Evidence |
|  | I can identify the action and reaction forces acting in a system. |  |
|  | I can diagram and calculate the components of force and motion. |  |
|  | I can calculate and compare the physical property of momentum between two objects. |  |
|  | I can explain the idea of impulse as it relates to changes in momentum. |  |
|  | I can apply the law of conservation to momentum of objects involved in ideal collisions. |  |

Vocabulary

conservation

elastic/inelastic

impulse

momentum

Newton’s Third Law

Formulas / Units Symbol – Measurement (Unit)

p = m v p – momentum (kg \* m/s)

m – mass (kilograms)

v – velocity (meters/second)

Δp = FΔt = Δp = mΔv Δp – impulse (Newton-seconds)

m1v1 + m2v2 = m1v1+ m2v2 (elastic collisions)

or = (m1 + m2)v (inelastic collisions)